

What Makes the Galilean Moons a Gateway to Inclusive STEM Learning?

Galilean Moons: Inclusive STEM Learning in UK Classrooms | Space4All Education

Description: Explore how Jupiter's Galilean moons can inspire inclusive STEM learning in KS2 and KS3 classrooms. Practical activity ideas, accessibility tips, and links to space careers.

Introduction: Opening the Skies for All Learners

Space has always inspired big dreams — rockets, astronauts, aliens, the Moon. But what if we could take that wonder and make it a doorway for all young people to access STEM?

Whether you're a teacher, home educator, or STEM ambassador, using space topics like the Galilean moons creates a powerful opportunity to build curiosity, accessibility, and long-term engagement in science — especially for learners who are too often left out.

At Space4All Education, we believe inclusion isn't an afterthought — it's the foundation. And Jupiter's moons give us the perfect starting point.

Who Are the Galilean Moons?

Discovered by Galileo Galilei in 1610, the four largest moons of Jupiter — Io, Europa, Ganymede, and Callisto — are worlds with dramatic features that modern space missions are still racing to understand.

Here's what makes each one special:

Moon	Unique feature
Io	The most volcanically active body in the Solar System
Europa	May contain a subsurface ocean that could support life
Ganymede	Largest moon in the Solar System, with its own magnetic field
Callisto	Ancient, heavily cratered, and possibly harbouring an ocean beneath its crust

Fun fact: ESA's JUICE (JUperiter ICy moons Explorer) mission is currently on its way to study Ganymede, Callisto, and Europa.

Fun Facts: The JUICE Mission

1. JUICE is Europe's biggest space mission to Jupiter. Launched by the European Space Agency (ESA) in 2023, it's exploring Jupiter and three of its biggest moons: Ganymede, Europa, and Callisto.
2. It's travelling around 600 million kilometres. That's more than 3,000 times the distance from Earth to the Moon. JUICE will take over 8 years to arrive at Jupiter in 2031.
3. It will study oceans under ice. These moons may have hidden oceans beneath their icy surfaces — JUICE will help us find out if they could support life.

4. It will orbit a moon, not just a planet. JUICE is the first spacecraft designed to go into orbit around another moon (Ganymede), not just the planet.
5. It has 10 science instruments onboard. They'll measure magnetic fields, take photos, listen to radio waves, and even look beneath the ice.
6. It uses solar power — far from the Sun. JUICE has huge solar panels (over 27 metres wide) to keep working in the weaker sunlight near Jupiter.
7. It won't land, but it will see a lot. It will fly by Europa and Callisto multiple times and orbit Ganymede for months, capturing detailed images and measurements.

Why These Moons Are Perfect for Inclusive STEM Learning

The Galilean moons tick so many boxes for inclusive, accessible learning.

1) They're unfamiliar — so everyone starts equal

Most children don't already "know the answer" about these moons. That creates a level playing field where curiosity matters more than confidence.

2) They engage neurodivergent learners

The extreme visuals of lava-spewing Io or Europa's cracked ice can be especially appealing to learners who enjoy patterns, contrasts, and fact-based learning. For autistic learners and others with SEND, these topics can feel concrete and captivating.

3) They support multiple ways to show learning

Learners can explore the moons through drawing, building, writing, roleplay, or storytelling. That flexibility supports different learning styles, communication needs, and comfort levels.

4) They connect directly to real space careers

From geology to astrobiology and robotics, each moon links to jobs that real people do — including roles within the UK space sector.

Activity Ideas for the Inclusive STEM Classroom (KS2-KS3)

Here are practical, inclusive ways to bring the Galilean moons to life.

Sensory Moon Match-Up

Match real-world textures to each moon:

- Io: coarse sandpaper (volcanic surface)
- Europa: a chilled gel pack (icy crust)
- Callisto: rough pumice (cratered rock)
- Ganymede: smooth metal (magnetic properties)

Alt text for image: "Four tactile materials used to represent the surfaces of Jupiter's moons."

Roleplay Mission: You're the Explorer

Divide into groups. Each team becomes a scientific crew sent to one moon. They must:

- Create a mission plan
- Draw the spacecraft
- Present their findings

Inclusion tip: Use a visual schedule and talking mats to support participation from non-verbal students.

Create a Moon Fact Poster (Class Display)

Use a simple poster template to create a visual display of one moon. Include:

- At least three facts
- A drawing
- One space-career link

Example: “Explore Europa!” (Printable Poster Template)

Moon facts

- Europa has a smooth icy surface with cracks.
- Scientists think there’s a salty ocean under the ice.
- It may be one of the best places to look for alien life.

Draw Europa here (Leave a large blank rectangle or space for learners to draw their own version of Europa.)

Space career connection

- Astrobiologist — a scientist who studies life in space. They explore whether Europa’s ocean could support tiny life forms.

Alt text for image: “A student-created fact poster about Europa, showing ice cracks and a spaceship.”

Inclusion in STEM Starts With Representation

Statistically, girls, ethnic minority pupils, pupils with SEND, and those from disadvantaged backgrounds are less likely to pursue science and maths. But they’re no less capable or curious.

What’s often missing is representation, support, and accessible routes in.

Teaching about the Galilean moons shows that science isn’t just textbooks and labs — it’s discovery, exploration, and teamwork. And it shows that future scientists, engineers, and astronauts can come from anywhere.

Linking the Moons to Space Careers in the UK

The UK is a growing force in the space sector — and these moons are more than abstract ideas. Here are some simple career links you can use for classroom discussion:

Moon	Related space careers
Io	Volcanologist, remote sensing technician
Europa	Astrobiologist, planetary protection specialist
Ganymede	Satellite engineer, data analyst
Callisto	Planetary geologist, AI robotics developer

Free Download: Inclusive Galilean Moons Toolkit

If you’d like to take this further, you can create a downloadable teacher pack that includes:

- Simplified fact sheets
- Visual aids for non-readers
- Sensory adaptation tips
- Careers-linked discussion prompts

Suggested Images & Alt Text

1. Galilean moons collage (NASA images) Alt text: "A collage of Io, Europa, Ganymede and Callisto showing their surface differences."
2. UK-based space career icons Alt text: "Illustrated icons of STEM careers including satellite engineer, astrobiologist, and mission planner."
3. Students doing the sensory moon activity Alt text: "A group of primary students exploring moon textures using tactile objects at a science table."

Final Thoughts: Let Curiosity Lead, Not Barriers

The Galilean moons show us that even 400 years after their discovery, space still holds the power to inspire.

In an inclusive STEM classroom, they're more than moons — they're launchpads. Launchpads for curiosity. For learning. For believing that science is for everyone.

When children explore space together — no matter their background, ability, or learning style — they're reminded that their voice matters in science too.